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KOBE STEEL (INDIA)

An ISO 9001 : 2008 Certified Co.



ISO CERTIFICATE



THIRD PARTY INSPECTION



I.B.R.





KOBE STEEL (INDIA)

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COMPANY PROFILE

KOBE STEEL (INDIA) is a young dynamic trading company which was found in 1994 and quickly established itself as a leader in the international markets through its 2 core strategies namely: total quality and flexibility.

QUALITY & FLEXIBILITY

Behind **KOBE STEEL (INDIA)** growth and success there is years of experience working in steel industry & closely monitoring our customer's demands. Exclusive technology, certified products, high quality standards and perfect customer's services: this is **KOBE STEEL (INDIA)** a true performer in the global market and a reliable partner for its customers.

SERVICES

Dedication to provide our clients with everything they need and more, is the cornerstone of **KOBE STEEL (INDIA)**. Managed by a team with more than 25 years' combined industry experience, we know & understand the pressures involved in the supply, specification, selection and use of different materials & grades.

Any size any grade any quality at a competitive price in all forms: pipes, tubes, plates, flanges, fittings, bars & customized forgings, demonstrates our flexibility. Adherence to customer's delivery needs and complex technical specification demonstrates our total quality.

PRODUCTS

Not only do we have a wide range of materials in different grades & sizes, to meet those requirements, we can deliver products off-the shelf and even keep back-up stock to support projects. This ensures our clients get the fastest and most cost-efficient service. Our unique relation with the industry experts keeps us updated and puts us and our customers at the heart of any technological innovations.

The unrivalled product portfolio is our core strength, with a strategic location in Mumbai; we seek to create a close long-term relationship with our clients. At the outset we aim to facilitate a smooth delivery. It is this overview of the whole process that creates reassurance, & more importantly, offers peace of mind.

PROCESS

And with continual enhancement programme, the company strives to maintain a market leading position through its research, investment & innovation.





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MAJOR CUSTOMER LIST



J.K. Lakshmi Cement Ltd



Gujarat State Electricity Corp.



Goa Shipyard Limited



Jocil Ltd



Zuari Industries Ltd

SIEMENS



Emerson Process Management (India) Pvt Ltd



Pennant Engineering Pvt Ltd



Bosch Chassis Systems India Ltd



QATARGAS



Hindustan Mittal Energy Ltd



Nitco Ltd



Mazagon Dock Ltd



Reliance Infrastructure Ltd



Hindustan Unilever Ltd



Praxair India Pvt. Ltd.



Deepak Fertilizer & Petrochemicals Ltd



THERMAX



Zuari Industries Ltd.



Aditya Birla Group



Where Innovation is a Tradition



Dept. of Atomic Energy



Naval Dockyard, Mumbai



ACC Ltd



Reliance Industries Ltd



Lanco Kondapalli Power Pvt. Ltd.



Bharat Petroleum Corporation Ltd.



HEG Limited



Madras Cements Ltd.



Bharat Heavy Electricals Ltd.



Shell



Larsen & Turbo Ltd



Mumbai Port Trust



Essar Group



Tata Projects Ltd



Oil & Natural Gas Corporation Ltd



National Thermal Power Corp. Ltd.



Nuclear Power Corporation of India



Chennai Port Trust



Atlas Copco



Ultratech Cement Ltd



Bharat Oman Refineries Ltd



Hindustan Zinc Ltd.



BGR Energy Systems Limited.



Forbes Marshall Pvt. Ltd.



Mahindra Vehicle Manufacturer Ltd.



Bharat Petroleum Corporation Ltd



Steel Authority of India Ltd



Hindustan Organic Chemicals Ltd



ONGC Mangalore Petrochemicals Ltd



Rama krishi Rasayan Ltd



Rama Phosphates Ltd



HLL Lifecare Limited
Innovating for Healthy Generations



KOBE STEEL (INDIA)

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CHEMICAL COMPOSITION OF STAINLESS STEEL

Stainless Steel is essentially a low carbon steel which contains chromium at 10% or more by weight. It is this addition of chromium that gives the steel its unique stainless corrosion resisting Properties. The corrosion resistance and other useful properties of the steel are enhanced by increased chromium content and the addition of other elements such as molybdenum, nickel and nitrogen.

Chemical Composition of Stainless Steel										Nearest Equivalent Specification	
AISI Grade	C Max	Mn Max	P Max	S Max	Si Max	Cr	Ni	Mo	Other Element	I.S.	En'

Austentic

201	0.15	5.5/7.5	0.06	0.03	1	16.0/18.0	3.5/5.5	-	-	-	-
202	0.15	7.5/10	0.06	0.03	1	17.0/19.0	4.0/6.0	-	-	-	-
301	0.15	2.0max	0.045	0.040	1.0	16.0/18.0	6.0/8.0	-	-	10Cr17Ni7	-
302	0.15	2.0	0.045	0.030	1.0	17.0/19.0	8.0/10.0	-	E-4-3-4%	07Cr18Ni9	En-58A
302HQ	0.03	2.0	0.045	0.03	1	17.0/19.0	9.0/10.0	-	CU:3-4.0	-	-
303	0.15	2.0	0.045	0.15 min	1.0	17.0/19.0	8.0/10.0	-	E-4-1%Max	15Cr18Ni9	En-58M
303EHS	0.15	2.0	0.02	0.3-0.33	1	17.0/19.0	8.0/10.0	-	CU:1%Max	-	-
304	0.08	2.0	0.045	0.030	1.0	18.0/20.0	8.0/10.0	-	-	04Cr18Ni10	En-58E
304L	0.030	2.0	0.045	0.030	1.0	18.0/20.0	8.0/12.0	-	-	02Cr18Ni11	-
304H	0.05	2.0	0.045	0.03	1	18.0/20.0	8.5/9.5	-	CU:-2-2.50	-	-
308	0.08	2.0	0.040	0.030	1.0	18.0/21.0	10.0/12.0	-	-	-	-
308LER	0.02	1.5/2.0	0.025	0.02	0.5	19.0/21.0	9.5/11.0	-	-	-	-
309	0.20	2.0max	0.045	0.030	1.0	22.0/24.0	12.0/15.0	-	-	20Cr24Ni12	-
309LER	0.03	1.5/2.5	0.02	0.015	0.5	23.0/25.0	12.0/14.0	-	-	-	-
309S	0.08	2.0	0.045	0.030	1.0	22.0/24.0	12.0/15.0	-	-	-	-
310	0.25	2.0	0.045	0.030	1.50	24.0/26.0	19.0/22.0	-	-	10Cr25Ni12	-
310S	0.08	2.0	0.045	0.030	1.50	24.0/26.0	19.0/22.0	-	-	-	-
314	0.25	2.0	0.040	0.030	1.5 / 3	25.0/26.0	19.0/22.0	-	-	-	-
316	0.08	2.0	0.045	0.030	1.0	16.0/18.0	10.0/14.0	2.0/3.0	-	04Cr17Ni12Mo2	En 58H
316L	0.030	2.0	0.045	0.030	1.0	16.0/18.0	10.0/14.0	2.0/3.0	-	03Cr17Ni12Mo2	-
316 LER	0.02	1.5/2.0	0.02	0.02	0.5	18.0/20.0	12.0/14.0	2.0/2.75	-	-	-
316Ti	0.080	2.0	0.045	0.030	1.0	16.0/18.0	10.0/14.0	2.0/3.0	Ti5xCmin	-	-
317	0.08	2.0	0.045	0.030	1.0	18.0/20.0	11.0/15.0	3.0/4.0	-	-	-
317L	0.030	2.0	0.045	0.030	1.0	18.0/20.0	11.0/15.0	3.0/4.0	N:0.10/0.22	-	-
317LN	0.03	2.0	0.045	0.03	1	18.0/20.0	11.0/15.0	3.0/4.0	N:0.10/0.22	-	-
321	0.08	2.0	0.045	0.030	1.0	17.0/19.0	9.0/12.0	-	Ti5xCmin	04Cr18Ni10Ti20	En-58C
347	0.08	2.0	0.045	0.030	1.0	17.0/19.0	9.0/12.0	-	Nb/Ta10xCmin	04Cr18Ni10Nb-40	En-58G
904L	0.02	2.0	0.045	0.035	1	19.0/23.0	23.0/28.0	4.0-5.0	CU : 1-2	-	-

Ferritic

410	0.15	1.00	0.04	0.03	1.0	11.50/13.5	0.60	-	-	12Cr13	En-56A
416	0.15	1.25	0.06	0.15min	1.0	12.0/14.0	1.25/2.50	-	-	-	-
420	0.15min	1.0	0.04	0.03	1.0	12.0/14.0	0.06	-	-	-	En-56C&D
430	0.12	1.0	0.04	0.03	1.0	16.0/18.0	0.06	-	-	07Cr17	En-60
430L	0.03	1.0	0.04	0.03	1.0	16.0/18.0	0.06	-	-	-	-
430F	0.12	1.25	0.06	0.15min	1.0	16.0/18.0	0.60	-	-	-	-
431	0.2	1.0	0.04	0.03	1.0	15.0/17.0	1.25/2.5	-	-	-	En-57
174-PH	0.07	1.0	0.04	0.03	1.0	15.0/17.0	3.0/5.0	-	NB : 0.15/0.45	-	-

Duplex

1905	0.03	1.2/1.8	0.04	0.03	1.2/2	18.0/19.0	4.3/5.2	2.5/3	N: 0.5/0.10	-	-
2205	0.03	2	0.03	0.02	1.0	21.0/23.0	4.5/6.5	2.5/3.5	N : 0.8/0.20	-	-
2506	0.08	1.0	0.04	0.03	0.75	26.0/28.0	4/5	1.3/2	-	-	-



KOBE STEEL (INDIA)

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STOCKIST

SUPPLIER

PIPE & TUBES

Stainless Steel , Duplex, Super Duplex

Seamless Type : ASTM A312, A213, A269, A790

Welded Type : ASTM A312, A358, A249, A790, A928

Grade : 304, 304L, 304H, 304LN, 316, 316L, 316H, 316Ti, 316LN, 317, 317L, 317LN, 309S, 309H, 310S, 310H, 321, 321H, 347, 347H, 347LN, S31254,

S31803, S32750, S32760, S32550

Size : 1/8" to 28" (Seamless) & 1" to 78" (welded)

Thickness : 1.5mm to 75mm

PIPE & TUBES

Carbon Steel / Alloys Steel / Chrome-Moly Steel

Seamless Type : API 5L, ASTM A106, A53, A333, A192

Welded Type : API 5L, ASTM A671, A672

High Yield Grade : X42, X46, X52, X56, X60, X65, X70, X80

High Temp Grade : A, B, C

Low Temp Grade : 1, 3, 4, 6, 7, 8, 9, 10, 11

Size : 1/8" to 60" (Seamless) & 1" to 108" (welded)

Thickness : 1.5mm to 250mm

Seamless Type : ASTM A335, A213, A691, A692

Welded Type : ASTM A691, A692

Grade : P1, P2, P5, P9, P11, P12, P22, P23, P91, P92

Size : 1/4" to 60" (Seamless) & 1" to 108" (welded)

Thickness : 1.5mm to 250mm

Weight of S.S. Pipe

O.D. (mm) - W. Thick (mm) x W. Thick (mm) x 0.0248 = Wt. Per Mtr.

O.D. (mm) - W. Thick (mm) x W. Thick (mm) x 0.00756 = Wt. Per Feet.

Weight of Brass Pipe / Copper Pipe

O.D. (mm) - Thick (mm) x Thick (mm) x 0.0260 = Wt. Per Mtr

Weight of Aluminium Pipe

O.D. (mm) - Thick (mm) x Thick (mm) x 0.0083 = Wt. Per Mtr..





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STAINLESS STEEL PIPE DIMENSION

STAINLESS STEEL PIPE DIMENSION AS PER ASTM WEIGHT - KG. MTR. (ANSI B 36.19 - 1965)														
Nominal Bore		Outside Diameter	Sch 5s		Sch 10s		Sch 40s		Sch 80s		Sch 160s		Sch xxs	
mm	INCH	mm	Wt mm	Weight (Kg/mt)	Wt mm	Weight (Kg/mt)	Wt mm	Weight (Kg/mt)	Wt mm	Weight (Kg/mt)	Wt mm	Weight (Kg/mt)	Wt mm	Weight (Kg/mt)
3	1/8	10.3	1.24	0.276	1.24	0.28	1.73	0.37	2.41	0.47	-	-	-	-
6	1/4	13.7	1.24	0.390	1.65	0.49	2.24	0.631	3.02	0.80	-	-	-	-
10	3/8	17.1	1.24	0.490	1.65	0.63	2.31	0.845	3.20	1.10	-	-	-	-
15	1/2	21.3	1.65	0.800	2.11	1.00	2.77	1.27	3.75	1.62	4.75	1.94	7.47	2.55
20	3/4	26.7	1.65	1.03	2.11	1.28	2.87	1.68	3.91	2.20	5.54	2.89	7.82	3.63
25	1	33.4	1.65	1.30	2.77	2.09	3.38	2.50	4.55	3.20	6.35	4.24	9.09	5.45
32	1.1/4	42.2	1.65	1.65	2.77	2.70	3.56	3.38	4.85	4.47	6.35	5.61	9.70	7.77
40	1.1/2	48.3	1.65	1.91	2.77	3.11	3.68	4.05	5.08	5.41	7.14	7.25	10.16	9.54
50	2	60.3	1.65	2.40	2.77	3.93	3.91	5.44	5.54	7.48	8.74	11.1	11.07	13.44
65	2.1/2	73.0	2.11	3.69	3.05	5.26	5.16	11.30	7.01	11.4	9.53	14.9	14..2	20.39
80	3	88.9	2.11	4.51	3.05	6.45	5.49	11.30	7.62	15.2	11.1	21.3	15.24	27.65
100	4	114.3	2.11	5.84	3.05	8.36	6.02	16.07	8.56	22.3	13.49	33.54	17.12	41.03
125	5	141.3	2.77	9.47	3.40	11.57	6.55	21.80	9.53	31.97	15.88	49.11	19.05	57.43
150	6	168.3	2.77	11.32	3.40	13.84	7.11	28.30	10.97	42.7	18.2	67.56	21.95	79.22
200	8	219.1	2.77	14.79	3.76	19.96	8.18	42.60	12.7	64.6	23.0	111.2	22.23	107.8
250	10	273.1	3.40	22.74	4.19	28.00	9.27	60.50	15.1	96.0	28.6	173.0	25.40	155.14
300	12	323.9	3.96	31.50	4.57	36.00	10.30	79.80	17.5	132.0	33.32	238.76	25.40	189.97
350	14	355.6	3.96	34.36	4.78	41.3	11.13	94.59	19.05	158.08	35.71	281.70	-	-
400	16	406.4	4.19	41.56	6.35	62.64	12.7	123.30	21.41	203.33	40.46	365.11	-	-
450	18	457.2	4.19	46.80	4.78	52.42	14.27	155.80	23.8	254.36	45.71	466.40	-	-
500	20	508.0	4.78	59.25	5.54	68.71	15.09	183.42	26.19	311.2	49.99	564.68	-	-
600	24	609.6	5.54	82.47	6.35	94.45	17.48	255.41	30.96	442.08	59.54	808.22	-	-



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SWG DIMENSIONS AND WEIGHTS (SWG WALL THICKNESS)

Outside diameter		22 SWG 0.711mm	20 SWG 0.914mm	18 SWG 1.218mm	16 SWG 1.625mm	14 SWG 2.032mm	12 SWG 2.641mm	11 SWG 2.946mm	10 SWG 3.257mm
Inches	mm	Kg/m	Kg/m	Kg/m	Kg/m	Kg/m	Kg/m	Kg/m	Kg/m
1/4"	6.350	--	0.124	0.157	0.192	--	--	--	--
5/16"	7.950	--	0.161	0.205	0.257	--	--	--	--
3/8"	9.525	--	0.197	0.253	0.321	0.381	--	--	--
1/2"	12.700	0.213	0.270	0.350	0.451	0.543	0.665	0.720	--
5/8"	15.875	0.270	0.342	0.447	0.580	0.704	0.875	0.954	--
3/4"	19.050	--	0.415	0.544	0.709	0.866	1.090	1.190	1.290
7/8"	22.225	0.383	0.488	0.641	0.838	1.030	1.300	1.420	1.550
1"	25.400	0.440	0.560	0.738	0.967	1.190	1.510	1.660	1.800
1 1/4"	31.750	0.553	0.706	0.931	1.230	1.510	1.930	2.130	2.320
1 1/2"	38.100	0.666	0.851	1.130	1.480	1.840	2.350	2.590	2.840
1 3/4"	44.450	0.779	0.996	1.320	1.740	2.160	2.770	3.060	3.350
2"	50.800	0.892	1.140	1.510	2.000	2.480	3.190	3.530	3.870
2 1/2"	63.500	--	--	1.900	2.520	3.130	4.030	4.470	4.910
3"	76.200	--	--	2.290	3.030	3.770	4.870	5.400	5.640
3 1/2"	88.900	--	--	2.670	3.550	4.420	5.700	6.340	6.970
4"	101.600	--	--	3.060	4.070	5.070	6.540	7.280	8.010
5"	127.000	--	--	3.628	4.970	6.010	7.926	--	9.673
5 1/2"	139.700	--	--	4.000	5.481	6.624	8.736	--	10.675
6"	152.400	--	--	4.360	6.000	7.330	9.545	--	11.699
6 1/2"	161.100	--	--	4.720	6.480	7.840	10.419	--	12.720

HIGHLIGHTS OF ASTM SPECIFICATION FOR STAINLESS STEEL TUBES AND PIPES

Specification	Allowable Outside Diameter Variation in mm			Allowable wall Thickness Variation				
Specification	Diameter	Over	Under	Over %	Under%	Over	Under	Testing
ASTM - 270 Seamless & Welded Sanitary Tubes	25.4 38.1 50.8 63.5 76.2 101.6	.05 .05 .05 .05 .08 .08	.20 .20 .28 .28 .30 .38	+12.5 +12.5 +12.5 +12.5 +12.5 +12.5	-12.5 -12.5 -12.5 -12.5 -12.5 -12.5	3.2 3.2 3.2 3.2 3.2 3.2	0 0 0 0 0 0	Reverse Flattering test 100% Hydrostatic test External polish on all tubes Refer to ASTM A-270
ASTM A - 249 Welded Boiler, Superheater, Heat Exchanger and Condenser Tubes	Under 25.4 25.4 - 38.1 incl. 38.1 - 50.8 excl. 50.8 - 63.5 excl. 63.5 - 76.2 excl. 76.2 - 101.6 incl.	0.1016 0.1524 0.2032 0.2540 0.3048 0.3810	0.1016 0.1524 0.2032 0.2540 0.3048 0.3810	+10 +10 +10 +10 +10 +10	-10 -10 -10 -10 -10 -10	3.175 3.175 3.175 3.760 4.760 4.760	0 0 0 0 0 0	Tension Test, Fletting test Flare Test * Reverse Bend Test Hardness Test 100% Hydrostatic Test Reverse Flattering Test Refer to ASTM A-450 Whenever applicable
ASTM A - 312 Seamless & Welded Pipes	13.7 - 48.3 incl. 48.3 - 114.3 incl. 114.3 - 220 incl.	0.40 0.79 1.59	0.79 0.79 0.79	Minimum Wall tubes 12.5% under nominal wall Specification		6.4 6.4 6.4	0 0 0	Tension Test Flattening Test 100% Hydrostatic Test (Normally Random lengths ordered)
ASTM A - 269 Seamless & Welded Tubes	Upto 12.7 12.7 - 38.1 excl. 38.1 - 88.9 excl. 88.9 - 139.7 excl. 139.7 - 203.2 excl.	0.13 0.13 0.25 0.38 0.76	0.13 0.13 0.25 0.38 0.76	+15 +10 +10 +10 +10	-15 -10 -10 -10 -10	3.2 3.2 4.8 4.8 4.8	0 0 0 0 0	Tension Test Flange Test (Welded only) Hardness Test Reverse Flattering test (Welded only) 100% Hydrostatic Test Refer to ASTM A-269
ASTM A - 213 Seamless Boiler, Superheater and Heat Exchanger Tubes	Upto 25.4 25.4 - 38.1 incl. 38.1 - 50.8 incl. 50.8 - 63.5 incl. 63.5 - 73.2 incl. 76.2 - 101.6 incl.	0.1016 0.1524 0.2032 0.2540 0.3048 0.3810	0.1016 0.1524 0.2032 0.2540 0.3048 0.3810	+20 +20 +22 +22 +22 +22	-0 -0 -0 -0 -0 -0	3.175 3.175 3.176 3.760 4.760 4.760	0 0 0 0 0 0	Tension Test Flattening Test Hardness test 100% Hydrostatic Test Refer to ASTM A-450
ASTM A - 268 Seamless & Welded Femtic Stainless Steel tubes	Upto 12.7 12.7 - 38.1 excl. 38.1 - 88.9 excl. 88.9 - 168.9 excl.	0.13 0.13 0.25 0.38	0.13 0.13 0.25 0.38	+15 +10 +10 +10	-15 -10 -10 -10	3.2 3.2 4.8 4.8	0 0 0 0	Tension Test Flange Test CERW only Hardness Test Reverse Flattering Test 100% Hydrostate Test
ASTM A - 358 For Welded big Diameter Pipes	For all size	+0.5%	0.5%	No Limit	-0.3 mm	Customer's Specification		--



KOBE STEEL (INDIA)

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PRODUCT RANGE

RODS / ROUND BAR

HEX

Stainless Steel & Super Duplex Bars as per ASTM A 276, A314, A582, A479, & A 484 Gr. TP 304, 304L 304H, 304LN, 309, 309S, 309H, 310S, 310H, 316, 316L, 316H, 316LN, 316TI, 317, 317L, 321, 321H, 347, 347H, 348, 348H, 409, 410, 420, 430, 440, 31803, 32750, 32760, 32550.

Alloy Steel Bars as per ASTM A 182 Gr. F1, F2, F5, F9, F11, F12, F22, F91 etc.

Carbon Steel Bars as per ASTM A105 & IS 2062 Gr. A & B.

Types : Round Bar, Wires, Hex & Square

Weight of S.S. Round Bar

$\text{DIA (mm)} \times \text{DIA (mm)} \times 0.00623 = \text{Wt. Per Mtr.}$

$\text{DIA (mm)} \times \text{DIA (mm)} \times 0.0019 = \text{Wt. Per Feet.}$

Weight of S.S. Square Bar

$\text{DIA (mm)} \times \text{DIA (mm)} \times 0.00788 = \text{Wt. Per Mtr.}$

$\text{DIA (mm)} \times \text{DIA (mm)} \times 0.0024 = \text{Wt. Per Feet.}$

Weight of S.S. Hexagonal Bar

$\text{A/F (mm)} \times \text{A/F (mm)} \times 0.00680 = \text{Wt. Per Mtr.}$

$\text{A/F (mm)} \times \text{A/F (mm)} \times 0.002072 = \text{Wt. Per Feet.}$

PLATES, SHEETS, COILS

Stainless Steel, Duplex, Super Duplex

Spec : ASTM A240/A480

Grade : 304, 304L, 304H, 304LN, 304N, 316, 316L, 316H, 316LN, 316N, 316Ti, 317, 321, 321H, 347, 347H, 31254, 31803, 32750, 32760, 32550

Size :

Width : 1000/1250/1500/2000/2500/3000/3500

Length: 2500/3000/5000/6000/12000/24000/Coil Form

Thickness : 0.25mm to 150mm

Carbon Steel (Boiler Quality)

Spec : ASTM A515, 516, IS-2062, IS-2002

Grade : GR. 55, 60, 65, 70

Alloy Steel (Chrome-Moly Steel)

Spec : ASTM A387

Grade : GR. 5, 11, 12, 22, 91

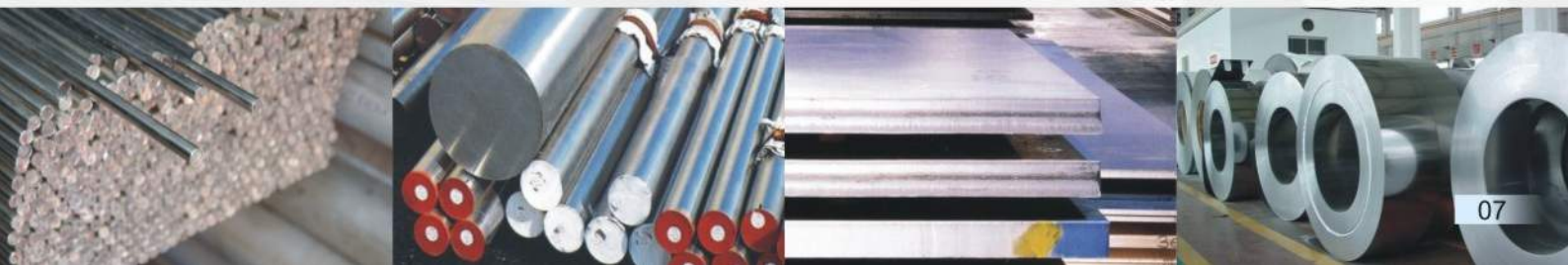
Weight of S.S. Sheets & Plates

$\text{Length (Mtrs)} \times \text{Width (Mtrs)} \times \text{Thick (mm)} \times 8 = \text{Kg. Per Sheet}$

$\text{Length (Ft)} \times \text{Width (Ft)} \times \text{Thick (mm)} \times 3/4 = \text{Kg. Per Sheet}$

Formula for Calculating Width of Sheet for making Pipe

$\text{Outer DIA} - \text{Wall Thickness} \times 22/7 = \text{Width of Sheet}$





KOBE STEEL (INDIA)

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STAINLESS STEEL BRIGHT BARS (PEELED/TURNED)

We, within a short span has become a major source for Stainless Steel Rolled / Forged / Peeled Rounds, Rcs, Blooms & Billets. We have huge stocks for our quality products which are supplied on time at lowest possible rates meeting most of our customer's requirement.

Product Range

Condition	Peeled, Centreless & Polished	Peeled & Polished	Peeled (Rough Turned)	Forged, Rough Turned
Grades	201, 202, 301, 303, 304, 304L, 310, 316, 316L, 321, 410, 416, 416, 420, 430, 431, 430F & others		304, 304L, 316L, 410, 416, 420, 430	303, 304, 304L, 316, 316L, 410, 416, 420, 431
Diameter (Size)	20mm to 85mm (3/4" to 3-1/4")	85mm to 140mm (3-1/4" to 5-1/2")	25mm to 140mm (1" to 5-1/2")	150mm to 400mm (6" to 16")
Diameter /+3mm Tolerance	h9 (Din 671) (ASTM A484)	h 11	K 12/K 13 (Din 1013)	-0mm to (-0"/+0.12")
Length	3/4/5, 6/6 meter (12/14ft/20 feet)	3/4/5, 6/6 meter (12/14ft/20 feet)	3/4/5, 6/6 meter 10 feet, 16 feet	3 meter - 5 meter
Length Tolerance	-0/+200mm of + 100mm to + 50mm (-0"/1 feet or +4" or 2")	-0/+ 200mm or +100mm or +50mm (-0"/+1 feet or +4" or 2")	-0/+ 100mm or 500mm (-0"/+3 feet or +2 feet)	-0/+2 meter -(-0/+6 feet)

ASTM A182 Alloy Steel Round Bar Chemical & Physical Properties

ASTM Grade	C	Mn	Si	S	P	Cr	Ni	Mo	Other	Tensile Psi (MPa)	Yield Psi (Mpa)	Elongation Strip/Round	Hardn.	Redu. in Area. (%)
182 F11 Class 2	0.10 0.20	0.30 0.80	0.50 1.0	0.04 max	0.04 max	1.0 1.50	-	0.04 0.65	-	70000 (485)	40000 (275)	20	143-207	30
A 182 F22 Class	0.05 0.15	0.30 0.60	0.50 max	0.04 max	0.04 max	2.0 2.50	-	0.87 1.13	-	75000 (515)	45000 (310)	20	156-207	30
A 182 F5	0.15 max	0.30 0.06	0.50 max	0.03 max	0.03 max	4.0 6.0	0.5 max	0.44 0.65	-	70000 (485)	40000 (275)	20	143-217	35
A 182 F9	0.15 max	0.30 0.60	0.50 1.00	0.03 max	0.03 max	8.0 10.0	-	0.90 1.10	-	85 (585)	55 (380)	20	179-217 (BHN)	40

Stainless Steel Bright Bars (Cold Drawn)

Condition	Cold Drawn and Polished	Cold Drawn, Center less Ground & Polished	Cold Drawn, Center less Ground and Polished (Strain Hardened)
Grades	201, 202, 303, 304, 304L, 310, 316, 316L, 321, 410, 420, 416, 430, 431, 430F, & others		304, 304L, 316, 316L
Diameter (Size)	2mm to 5mm (1/8" to 3/16)	6mm to 22mm (1/4" to 7/8")	10mm to 40mm (3/8" to 1-1/2")
Diameter Tolerance	h9 (Din 671), h11 ASTM A 484	h9 (Din 671) ASTM A 484	h9 (Din 671), h11 ASTM A 484
Length	3/4/5, 6/6 meter (12/14ft/20 feet)	3/4/5, 6/6 meter (12/14ft/20 feet)	3/4/5, 6/6 meter (12/14/20 feet)
Length Tolerance	-0/+ 200mm of +100mm or +50mm (-0"/+1 feet or +4" or 2")	-0/+200mm or +100mm or +50mm (-0"/+1 feet or +4" or 2")	-0/+200mm (-0"/+1 feet)



Stainless Steel Hexagon & Square Bars

Type	Cold Drawn and Polished (Squares)	Cold Drawn and Polished (Hexagons)
Grades	304, 304L, 316, 316L	304, 304L, 316, 316L
Diameter	5mm to 40mm (1/4" to 1-1/2")	10mm to 40mm (3/8" to 1-1/2")
Diameter	h 11	h 11
Tolerance	(ASTM A 484)	(ASTM A 484)
Length	3/4/6 meter (12/14ft/20feet)	3/4/6 meter (12/14ft/20 feet)
Length Tolerance	-0/+500mm (-0"/+2 feet)	-0/+500mm or + 100mm or +50mm (-0"/+2feet)

Stainless Steel Cold Heading Wires

Condition	Cold drawn, Annealed and Pickled
Diameter	1.6 mm to 17 mm (1/16" to 11/16")
Tensile Strength	65kg / mm2 max
Packing	HDPE wrapped coils of 300 kg to 500 kg
Grades	202, 304, 304L, 316, 316L, 304HC, 302HQ

DUPLEX STEEL & SUPER DUPLEX STEEL

UNS number Duplex Grades	Type ^b	C	Mn	P	S	Si	Cr	Ni	Mo	N	Cu	Other
S31803	-	0.030	2.00	0.030	0.020	1.00	21.0 - 23.0	4.5 - 6.5	2.5 - 3.5	0.08 - 0.20	-	-
S32205	2205	0.030	2.00	0.030	0.020	1.00	19.5 - 21.5	4.5 - 6.5	3.0 - 3.5	0.14 - 0.20	-	-
S32550	255	0.04	1.50	0.040	0.030	1.00	24.0 - 27.0	4.5 - 6.5	2.9 - 3.9	0.10 - 0.25	1.5 - 2.5	-
S32750	2507	0.030	1.20	0.035	0.020	0.80	24.0 - 26.0	6.0 - 8.0	3.0 - 5.0	0.24 - 0.32	0.50	-
S32760	-	0.030	1.00	0.030	0.010	1.00	24.0 - 26.0	6.0 - 8.0	3.0 - 4.0	0.20 - 0.30	0.50 - 1.00	-
S32900	329 ^a	0.06	1.00	0.040	0.030	0.75	23.0 - 28.0	2.5 - 5.0	1.0 - 2.0	-	-	-

Duplex Stainless Steel and their characteristics

Duplex Stainless steels were developed more than 70 years ago in Sweden for use in the sulfite paper industry. Duplex alloys were originally created to combat corrosion problems caused by chloride-bearing cooling waters and other aggressive chemical process fluids.

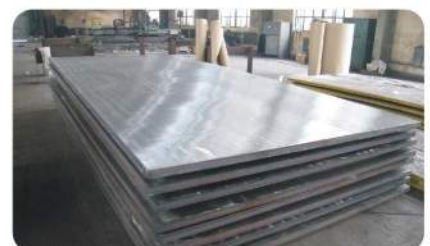
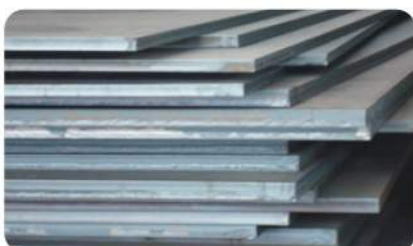
Called Duplex because of its mixed microstructure with about equal proportions of ferrite and austenite, duplex stainless steels are a family of grades, which range in corrosion performance depending on their alloy content. The chemical composition based on high contents of Cr and Mo improves intergranular and pitting corrosion resistance respectively. Additions of nitrogen can promote structural hardening by interstitial solid solution mechanism, which raises the yield strength and ultimate strength values without impairing toughness. Moreover, the two-phase microstructure guarantees higher resistance to pitting and stress corrosion cracking in comparison with conventional stainless steels.

Coinciding with the 1970's development of offshore gas and oilfields in the North Sea, a second-generation Duplex was introduced and quickly became the duplex steel of choice. With deliberate addition of nitrogen as an alloying agent, both improved toughness in the heat-affected zones of welds and excellent chloride corrosion resistance was achieved thus quickly becoming the workhorse of stainless steels, accounting for more than 80% of duplex use. Its popularity is also cost-based as the replacement of the nickel content with the less-expensive addition of nitrogen.

Duplex alloys are essentially a compromise possessing some of the ferritic stress corrosion cracking resistance and much of the superior formability of the common austenitic stainless alloys at a cost saving over the high nickel alloys.

BENEFITS

- High strength,
- High resistance to pitting, crevice corrosion resistance.
- High resistance to stress corrosion cracking, corrosion fatigue and erosion.
- Good sulfide stress corrosion resistance,
- Low thermal expansion and higher heat conductivity than austenitic steels,
- Good workability and weldability.
- High energy absorption.





KOBE STEEL (INDIA)

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SHEETS / PLATES

IS - 2002 - 62 STEEL PLATES FOR BOILERS

Designation	Chemical Composition					Tensile test			Elongation	
	C% max	Mn% max	Si% max	P% max	S% max	Tensile Strength Kf/mm ²	Yield Strength Kf/mm ² min		Test	%min piece
IS 2002-1	0.18	0.5-1.2	0.15-0.35	0.035	0.040	36.7-49	24	23	5.65√Sc	24
IS 2002-2	0.20	0.5-1.2	0.15-0.35	0.035	0.040	41.7-54	27	26	5.65√Sc	22
IS 2002-3	0.22	0.5-1.2	0.15-0.35	0.035	0.040	46.8-59	29.5	29	5.65√Sc	21

CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES OF IS : 2062 - 1999

Grade Designation		Ladle Analysis, Percent, Max				Carbon	Deoxidation Equivalent (CE), Max	Mode	Supply Condition
(1)	(2)	C (3)	Mn (4)	S (5)	P (6)	Si (7)	(8)	(9)	(10)
A	Fe 410W A	0.23	1.50	0.050	0.050	0.40	0.42	Semi-killed or Killed	As rolled
B	Fe 410W B	0.22	1.50	0.045	0.045	0.40	0.41	Killed	As rolled Plates above 12 mm may be normalized/controlled cooled if agreed to between the purchaser and the manufacturer
C	Fe 410W C	0.20	1.50	0.040	0.040	0.40	0.39	Killed	As rolled Plates above 12 mm shall be normalized/controlled cooled

NOTES

$$1. Ce \text{ based on ladle analysis} = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Ni+Cu}{15}$$

Grade	Designation	Tensile Strength Min, MPa	Yield Stress, Min, MPa			Percent Elongation at Gauge Length $5.65 \sqrt{S_0}$	Internal Diameter Of Bend	Charpy V. Notch Impact Energy J, Min
			<20	20-40	>40			
(1)	(2)	(3)	mm (4)	mm (5)	mm (6)	Min (7)	Min (8)	(9)
A	Fe 410W A	410	250	240	230	23	3t	—
B	Fe 410W B	410	250	240	230	23	2t for less than or equal to 25 mm thick products 3t for more than 25 mm thick product	27 (see Note1)
C	Fe 410W C	410	250	240	230	23	2t	27

NOTES

1 For Grade B material, the minimum Charpy V-notch impact energy is to be guaranteed at 0°C, if agreed to between the manufacturer and the purchaser.

2 For Grade C material, the minimum Charpy V-notch impact energy shall be guaranteed at any one of the three temperatures, namely 0°C or -20°C or -40°C, as specified by the purchaser.

3 't' is the thickness of the material.

4 The Impact values are given for a standard test piece. When tested with subsidiary test pieces, the values shall not be less than

Test Piece Size (mm)	Charpy V-Notch Impact Energy J, Min
10 x 7.5	22
10 x 5	19.5

ASTM A 537 -35 PRESSURE VESSEL PLATES, HEAT TREATED, CARBON MANGANESES-SILICON STEEL

Designation	Chemical Composition										Heat Treatment	Tensile Strength			Elongation %min	
	C% max	Mn% max	t<1-1/2(38)		P% max	S% max	Cu% max	Ni% max	Cr% max	Mo% max		Thickness in mm	Tensile Strength Ksi(MPa)	Yield Strength Ksi (MPa) min	GL=8 in or 200 mm	GL=2 in or 50 mm
A 537 -1	0.24	0.15-0.50	0.70-1.35	1.0-1.60	0.035	0.040	0.035	0.25	0.25	0.08	Normalised	t<2-1 (64) 2-1/2<t<4 (100)	70-90 (485-620) 65-85 (450-585)	50 (345) 45 (310)	18	22
A 537-2	0.24	0.15-0.50	0.70-1.35	1.0-1.60	0.035	0.040	0.035	0.25	0.25	0.08	Quenched & Tempered	t<2-1/2 (64) 2-1/2<t<4 (100)	80-100 (500-690) 75-95 (515-655)	60 (415) 55 (380)	-	22



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PRODUCT RANGE

BUTT WELDING FITTINGS

(Elbows, Tees, Reducers, Caps, Stub End)

Alloy Steel (Chrome-Moly Steel)

Seamless Type : ASTM A234-S

Welded Type : ASTM A234-W

Grade : WP1, WP2, WP5, WP9, WP11, WP12, WP22, WP91

Carbon Steel

Seamless Type : ASTM A234-S, A420-S, ASTM A860/MSS
SP-75-S

Welded Type : ASTM A234-W, A420-W, ASTM A860/MSS
SP-75W

Grade : WPB, WPC, WPL1, WPL3, WPL6, WHPY42, WHPY46,
WHPY46, WHPY52, WHPY56, WHPY60, WHPY65, WHPY70,
WHPY80

Stainless Steel, Duplex, Super Duplex

Seamless Type : ASTM A403-S, A815-S

Welded Type : ASTM A403-W, A815-W

Grade : WP304, WP304L, WP304H, WP304LH, WP304N,
WP316, WP316L, WP316H, WP316LN, WP316N, WP316Ti,
WP 321, WP321H, WP347, WP347H, WPS31254, WPS31803,
WPS32750, WPS32760, WPS32550

Size : 1/8" to 100" (Seamless) & 1" to 150" (welded)

Thickness : 1.5mm to 200mm

SOCKET WELDING (FORGED) FITTINGS

(Elbows, Tees, Reducers, Caps, Coupling, Unions,
Plugs, Nipples, Olets)

Alloy Steel (Chrome-Moly Steel)

Forged Type : ASTM A182

Grade : F1, F2, F5, F9, F11, F12, F22, F91

Carbon Steel

Forged Type : ASTM A105, A350

Grade : LF1, LF2, LF3

Stainless Steel

Forged Type : ASTM A182

Grade : F304, F304L, F304H, F316, F316L,
F316H, F316Ti, F321, F321H, F347, F347H

Size : 1/2" to 4"

Rating : 3000, 6000, 9000



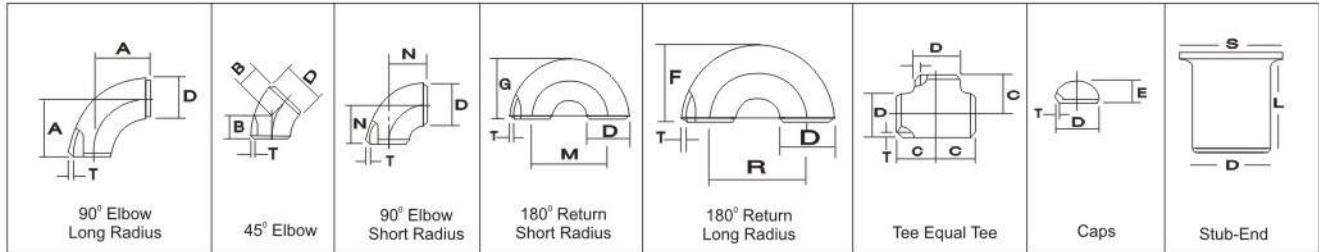


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DIMENSIONS OF BUTT-WELDING FITTING ANSI B-16.9 / B-16.28



Nominal Pipe Size		Outside Diameter	Center to Face				Back to Face			Center to Center			Length 'L'	
INCH	MM	D	A R=1.5D	B	C	N R=1D	E	F	G	R	M	S	Short L	Long L
1/2	15	21.3	38.00	16.0	25.0	-	25.0	48.0	-	76.0		35.0	50.8	76.2
3/4	20	26.7	29.00	11.0	29.0	-	25.0	43.0	-	57.0		43.0	50.8	76.2
1	25	33.4	38.00	22.0	38.0	25.0	38.0	56.0	41.0	76.0	51.0	51.0	50.8	101.6
1.1/4	32	42.2	48.00	25.0	48.0	32.0	38.0	70.0	52.0	95.0	64.0	64.0	50.8	101.6
1.1/2	40	48.3	57.15	29.0	57.0	38.0	38.0	83.0	62.0	114.0	76.0	73.0	50.8	101.6
2	50	60.3	76.00	35.0	64.0	51.0	38.0	106.0	81.0	152.0	102.0	93.0	63.5	152.4
2.1/2	65	73.0	95.25	44.0	76.0	64.0	38.0	132.0	100.0	191.0	127.0	105.0	63.5	152.4
3	80	88.9	114.30	51.0	86.0	76.0	51.0	159.0	121.0	229.0	152.0	127.0	63.5	152.4
3.1/2	90	101.6	133.35	57.0	95.0	89.0	64.0	184.0	140.0	267.0	178.0	140.0	76.2	152.4
4	100	114.3	152.0	64.0	105.0	102.0	64.0	210.0	159.0	305.0	203.0	157.0	76.2	152.4
5	125	141.3	190.0	79.0	123.0	127.0	76.0	262.0	197.0	381.0	254.0	186.0	76.2	203.2
6	150	168.3	229.0	95.0	143.0	152.0	89.0	313.0	237.0	457.0	305.0	218.0	88.9	203.2
8	200	219.1	305.0	127.0	178.0	203.0	102.0	414.0	313.0	610.0	406.0	270.0	101.6	203.2
10	250	273.1	381.0	159.0	216.0	254.0	127.0	515.0	391.0	762.0	508.0	324.0	127.0	254.0
12	300	323.8	457.0	190.0	254.0	305.0	152.0	619.0	467.0	914.0	610.0	381.0	152.4	254.0
14	350	355.6	533.0	222.0	279.0	356.0	165.0	711.0	533.0	1067.0	711.0	413.0	152.4	305.0
16	400	406.4	610.0	254.0	305.0	406.0	178.0	813.0	610.0	1219.0	813.0	470.0	152.4	305.0
18	450	457.2	686.0	286.0	343.0	457.0	203.0	914.0	686.0	1372.0	914.0	533.0	152.4	305.0
20	500	508.0	762.0	318.0	381.0	508.0	229.0	1016.0	762.0	1524.0	1016.0	584.0	152.4	305.0
22	550	559.0	838.0	343.0	419.0	559.0	254.0	1118.0	838.0	1676.0	1118.0	614.4	152.4	305.0
24	600	610.0	914.0	381.0	432.0	610.0	267.0	1219.0	914.0	1829.0	1219.0	692.0	152.4	305.0
26	650	660.0	991.0	405.0	495.0	660.0	267.0							
28	700	711.0	1067.0	438.0	521.0	771.0	267.0							
30	750	762.0	1143.0	470.0	559.0	762.0	267.0							
32	800	813.0	1219.0	502.0	597.0	813.0	267.0							
34	850	864.0	1295.0	533.0	635.0	864.0	267.0							
36	900	914.4	1372.0	565.0	673.0	914.0	267.0							

All Dimensions in Millimeters



KOBE STEEL (INDIA)

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BUTT-WELDING FITTINGS ASTM SPECIFICATION

MATERIAL SPECIFICATION FOR SEAMLESS / WELDED BUTT-WELDING PIPE-FITTINGS.

SPECIFICATION (ASTM-2002)		CHEMICAL PROPERTIES					MECHANICAL PROPERTIES				OTHERS		
		C%	Mn%	P% (Max)	S% (Max)	Si%	Cr%	Mo%	Ni%	U.T.S. (Min) Mpa		Y.S. (Min) Mpa	ELONG. (Min) L
STAINLESS STEEL													
A 403 Gr. WP 304	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	-	8.0-11.0	515	205	28	20	-
A 403 Gr. WP 304L	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	-	8.0-12.0	485	170	28	20	-
A 403 Gr. WP 304H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	-	8.0-11.0	515	205	28	20	-
A 403 Gr. WP 304LN	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	-	8.0-11.0	515	205	28	20	N%=0.10-0.16
A 403 Gr. WP 309	0.20 Max	2.00 Max	0.045	0.030	1.00 Max	22.0-24.0	-	12.0-15.0	515	205	28	20	-
A 403 Gr. WP 310S	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	24.0-26.0	-	19.0-22.0	515	205	28	20	-
A 403 Gr. WP 316	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	2.0-3.0	10.0-14.0	515	205	28	20	-
A 403 Gr. WP 316L	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	2.0-3.0	10.0-14.0	485	170	28	20	-
A 403 Gr. WP 316H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	2.0-3.0	10.0-14.0	515	205	28	20	-
A 403 Gr. WP 316LN	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	2.0-3.0	10.0-13.0	515	205	28	20	N%=0.10-0.16
A 403 Gr. WP 317	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	3.0-4.0	11.0-15.0	515	205	28	20	-
A 403 Gr. WP 317L	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	3.0-4.0	11.0-15.0	515	205	28	20	-
A 403 Gr. WP 321	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	-	9.0-12.0	515	205	28	20	Ti%=(5XC)-0.70
A 403 Gr. WP 321H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	-	9.0-12.0	515	205	28	20	Ti%=(4XC)-0.70
A 403 Gr. WP 347	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	-	9.0-12.0	515	205	28	20	Cb%=(10XC)-1.10
A 403 Gr. WP 347H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	-	9.0-12.0	515	205	28	20	Cb%=(8XC)-1.10
CARBON STEEL													
A 234 Gr. WPB	0.30 Max	0.29-1.06	0.050	0.058	0.10 Min	0.40 Max	0.15 Max	0.40 Max	415-655	240	30	20	197
A 234 Gr. WPC	0.35 Max	0.29-1.06	0.050	0.058	0.10 Min	0.40 Max	0.15 Max	0.40 Max	485-655	275	30	20	197
LOW TEMPERATURE CARBON STEEL													
A 420 Gr. WPL6	0.30 Max	0.50-1.35	0.035	0.040	0.15-0.40	0.30 Max	0.12 Max	0.40 Max	415-655	240	30	16.5	197
A 420 Gr. WPL 3	0.20 Max	0.31-0.64	0.050	0.050	0.13-0.37	-	-	3.20-3.80	450-620	240	30	20	197
ALLOY STEEL													
A 234 Gr. WP 1	0.28 Max	0.30-0.90	0.045	0.045	0.10-0.50	-	0.44-0.65	-	380-550	205	30	20	197
A 234 Gr. WP 5	0.15 Max	0.30-0.60	0.040	0.030	0.50 Max	4.0-6.0	0.44-0.65	-	415-585	205	30	20	217
A 234 Gr. WP 9	0.15 Max	0.30-0.60	0.030	0.030	1.00 Max	8.0-10.0	0.90-1.10	-	415-585	205	30	20	217
A 234 Gr. WP 11 CL1	0.05-0.15	0.30-0.60	0.030	0.030	0.50-1.0	1.0-1.5	0.44-0.65	-	415-585	205	30	20	197
A 234 Gr. WP 11 CL2	0.05-0.20	0.30-0.80	0.040	0.040	0.50-1.0	1.0-1.5	0.44-0.65	-	485-655	275	30	20	197
A 234 Gr. WP 11 CL3	0.05-0.20	0.30-0.80	0.040	0.040	0.50-1.0	1.0-1.5	0.44-0.65	-	520-690	310	30	20	197
A 234 Gr. WP 12 CL1	0.05-0.20	0.30-0.80	0.045	0.045	0.60 Max	0.80-1.25	0.44-0.65	-	415-585	220	30	20	197
A 234 Gr. WP 12 CL2	0.05-0.20	0.30-0.80	0.045	0.045	0.60 Max	0.80-1.25	0.44-0.65	-	485-655	275	30	20	197
A 234 Gr. WP 22 CL1	0.05-0.15	0.30-0.60	0.040	0.040	0.50 Max	1.90-2.60	0.87-1.13	-	415-585	205	30	20	197
A 234 Gr. WP 22 CL3	0.05-0.15	0.30-0.60	0.040	0.040	0.50 Max	1.90-2.60	0.87-1.13	-	520-690	310	30	20	197
A 234 Gr. WP 91	0.08-0.12	0.30-0.60	0.020	0.010	0.20-0.50	8.0-9.5	0.85-1.05	0.40 Max	585-760	415	20	-	248
Va%=0.18-0.25, Cr%=0.06-0.10, N%=0.03-0.07, Al%=0.04 Max													



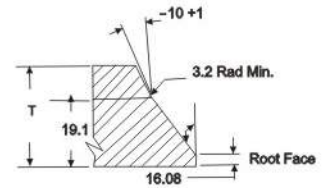
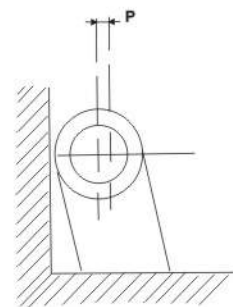
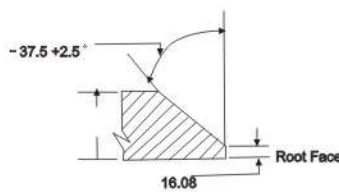
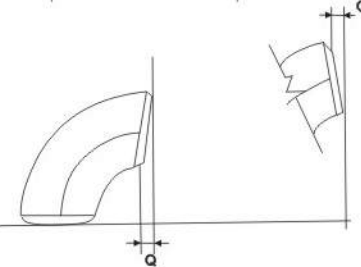
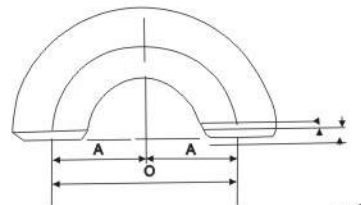
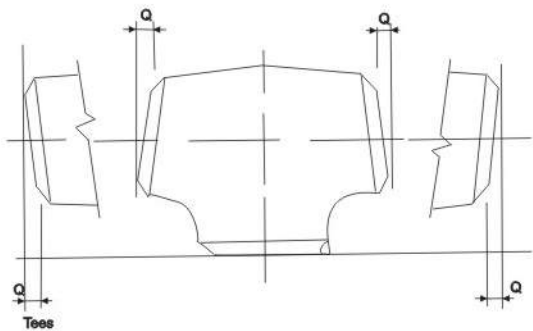
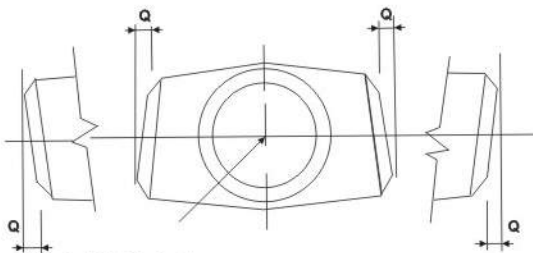
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DIMENSIONAL TOLERANCE ANSI B16.9/B16.28/MSS SP-43

ALL FITTINGS					90°/60°/45° 30° ELBOWS & TEES		REDUC- ERS		180° RETURNS					CAPS		ANGULARITY TOLERANCE																	
Nominal Pipe size INCH/MM	Outside Diameter at Bevel		Inside Dia Meter	Wall Thickness at End		Center to End		Overall Lenth Dimension		Center to End		Back to Face Dimension		Alingment of End Dimintions		Overall Lengh		Nominal Pipe Size		Off Angel Inch/mm	Off Plane												
	D			T		A,B,C,M		H		O		K		U		E		Q		P													
	(1) B16.9	MSS Sp43	(2) B16.9	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43		B16.9	MSS SP75	B16.9												
½" - 2½" 15 - 65	±1.6 - 0.8	+0.80	±0.8	Not Less Than 87.5% Nominal Thk	Not Less Than 87.5% Nominal Thk	FROM ½" TO 18 15 TO 600	FROM ¾" - 3" - 15 TO 600	FROM 1/2" - 24" 15 - 600	FROM 1/2" - 8" 15 - 200	±6	±6.35	±6.0	±6.4	±1	±0.8	±3	±3.17	½" - 4" 15 - 100	±1	16" - 24" 400 - 600 1.6	±2												
3" - 3½" 80 - 90	±1.6		±1.6			±2	±1.60	±2	±1.60									±6	±6.35		±6.0	±6.4	±1	±0.8	5" - 8" 125 - 200	±2	±4						
4" 100																									10" - 12" 250 - 300	±3	±5						
5" - 6" 125 - 150	+2.4 -1.6															+1.60 -0.80	±6								±6.35	14" - 16" 350 - 400	±3	±7					
8" 200		18" - 24" 450 - 600	±4																								±10						
10" - 18" 250 - 450	+4 -3.2	+2.38 -0.80	±3.2													±2.40											10" - 24" +2.38 250 - 600	±10	±10	±2.0"	±1.60	26" - 30" 650 - 750	±5
20" - 24" 500 - 600	+6.4 -4.8	3.17 0.79	±4.8														32" - 42" 800 - 1050								±5	±13							
26" - 30" 650 - 750	+6.4 -4.8	±4.8															±10								44" - 48" 1100 - 1200	±5						32" - 48" 950 - 1200 3.2	±20
32" - 48" 800 - 1200	+6.4 -4.8	±4.8																								42" - 48" 1050 - 1200						±5	±20





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PRODUCT RANGE

FLANGES

(Welding Neck, Slip on / Threaded, Lap Joint, Blind, Socket Welding, Orifice, Long Neck)

Alloy Steel (Chrome-Moly Steel)

Forged Type : ASTM A182

Grade : F5, F9, F11, F12, F22, F91

Carbon Steel

Forged Type : ASTM A105, A350

Grade : LF2

Stainless Steel

Forged Type : ASTM A182

Grade : F304, F304L, F304H, F316, F316L,

F316H, F316Ti, F321, F321H, F347, F347H

Size : 1/2" to 48"

Rating : 150#, 300#, 600#, 900#, 1500#, 2500#

CUSTOM FORGINGS

(Open Die Forgings, Rolled Ring Forgings)

Material Grade : Carbon Steel, Alloy Steel, Stainless Steel,

Duplex, Super Duplex, Monel, Inconel, Incoloy, Hastalloy,

Titanium, Cupro-Nickel, Aluminium & all other Exotic Alloy

Forms & Shapes : Blanks, Rings, Hubs / Tooled Forging, Bars,

Spindle, Hollow, Torch Cut / Unusual Shapes,

Max Capacity per Forging

Rings & Blanks: 124" OD

Bars : 16" OD

Hollows : 80" OD /ID & Length 360"

Weight : 35 MT, Conc. or Ecc

Spindles : 65" OD & Length 600"

Torch Cut/Unusual Shapes : Forge 32" Thick (max)

Cross Section : 100" x 144"

Exotic Alloys

Material Grade : Alloy 200, 201, Monel 400, K-500, Inconel 600,

601, 625, Incoloy 800, 800H, 800HT, 825, DS, Hastalloy B, B2, C,

C4, C22, C276, G, G3, X, Titanium Gr. 1, 2, Cupro-Nickel 90-10,

70-30, Alloy 20, 904L, AL-6XN

Form Pipes, Tubes, Sheets, Plates, Bars, Wires, Fittings,

Flanges.

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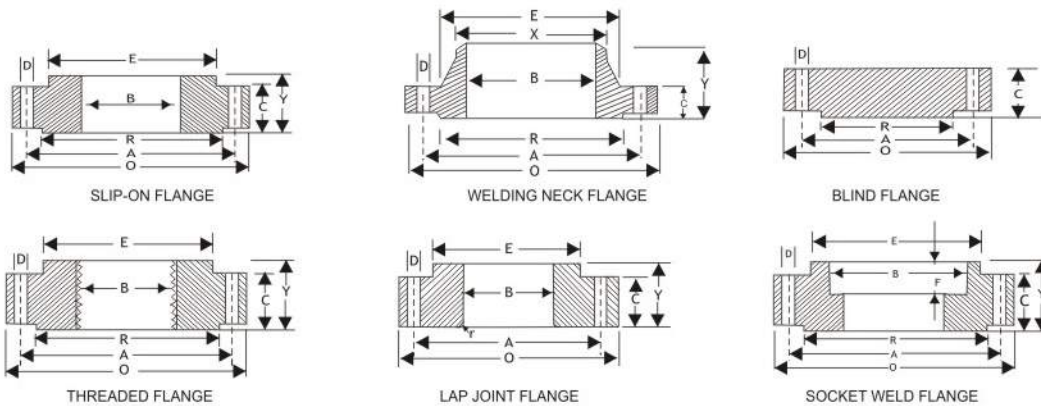




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DIMENSION OF CLASS 150 & 300 FLANGES AS PER ANSI B 16.5



DIMENSIONS OF CLASS150 FLANGES AS PER B16.5

Nominal Pipe Size	Flange Dia O	Dia of Bolt Circle A	No. Of Bolt Holes D	No. Of Holes	Thk of Flange C	Dia of Hub E	Length through Hub			Dia Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B			
15	88.9	60.3	15.9	4	11.1	30.2	15.9	47.6	15.9	22.3	22.9	34.9	9.5	21.33
20	98.4	69.8	15.9	4	12.7	38.1	15.9	52.4	15.9	27.7	28.2	42.9	11.1	26.67
25	107.9	79.4	15.9	4	14.3	49.2	17.5	55.6	17.5	34.5	35.0	50.8	12.7	33.40
32	117.5	88.9	15.9	4	15.9	58.7	20.6	57.1	20.6	43.2	43.7	63.5	14.3	42.16
40	127.0	98.4	15.9	4	17.5	65.1	22.2	61.9	22.2	49.5	50.0	73.0	15.9	48.26
50	152.4	120.6	19.0	4	19.0	77.8	25.4	63.5	25.4	62.0	62.5	92.1	17.5	60.31
65	177.8	139.7	19.0	4	22.2	90.5	28.6	69.8	28.6	74.7	75.4	104.8	19.0	73.02
80	190.5	152.4	19.0	4	23.8	107.9	30.2	69.8	30.2	90.7	91.4	127.0	20.6	88.90
100	228.6	190.5	19.0	8	23.8	134.9	33.3	76.2	33.3	116.1	116.8	157.2	23.8	114.30
125	254.0	215.9	22.2	8	23.8	163.5	36.5	88.9	36.5	143.8	144.5	185.7	23.8	141.30
150	279.4	241.3	22.2	8	25.4	192.1	39.7	88.9	39.7	170.7	171.4	215.9	27.0	168.27
200	342.9	298.4	22.2	8	28.6	246.1	44.4	101.6	44.4	221.5	222.2	269.9	31.7	219.07
250	406.4	361.9	25.4	12	30.2	304.8	49.2	101.6	49.2	276.3	277.4	323.8	33.3	273.05
300	482.6	431.8	25.4	12	31.8	365.1	55.6	114.3	55.6	327.1	328.2	381.0	39.7	323.85
350	533.4	476.2	28.6	12	34.9	400.0	57.1	127.0	79.4	359.1	360.2	412.7	41.3	355.60
400	596.9	539.7	28.6	16	36.5	457.2	63.5	127.0	87.3	410.5	411.2	469.9	44.4	406.40
450	635.0	577.8	31.7	16	39.7	504.8	68.3	139.7	96.8	461.8	462.3	533.4	49.2	457.20
500	698.5	635.0	31.7	20	42.9	558.8	73.0	144.5	103.2	513.1	514.3	584.2	54.0	508.00
600	812.8	749.3	34.9	20	47.6	663.6	82.5	152.4	111.1	615.9	615.9	692.1	63.5	609.60

DIMENSIONS OF CLASS 300 FLANGES AS PER B16.5

Nominal Pipe Size	Flange Dia O	Dia of Bolt Circle A	No. Of Bolt Holes D	No. Of Holes	Thk of Flange C	Dia of Hub E	Length through Hub			Dia Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B			
15	95.2	66.7	15.9	4	14.3	38.1	22.2	52.4	22.2	22.3	22.9	34.9	9.5	21.33
20	117.5	82.5	19.0	4	15.9	47.6	25.4	57.1	25.4	27.7	28.2	42.9	11.1	26.67
25	123.8	88.9	19.0	4	17.5	54.0	27.0	61.9	27.0	34.5	35.0	50.8	12.7	33.40
32	133.3	98.4	19.0	4	19.0	63.5	27.0	65.1	27.0	43.2	43.7	63.5	14.3	42.16
40	155.6	114.3	22.2	4	20.6	69.8	30.2	68.3	30.2	49.5	50.0	73.0	15.9	48.26
50	165.1	127.0	19.0	8	22.2	84.1	33.3	69.8	33.3	62.0	62.5	92.1	17.5	60.31
65	190.5	149.2	22.2	8	25.4	100.0	38.1	76.2	38.1	74.7	75.4	104.8	19.0	73.02
80	209.5	168.3	22.2	8	28.6	117.5	42.9	79.4	42.9	90.7	91.4	127.0	20.6	88.90
100	254.0	200.0	22.2	8	31.8	146.0	47.6	85.7	47.6	116.1	116.8	157.2	23.8	114.30
125	279.4	234.9	22.2	8	34.9	177.8	50.8	98.4	50.8	143.8	144.5	185.7	-	141.30
150	317.5	269.9	22.2	12	36.5	206.4	52.4	98.4	52.4	170.7	171.4	215.9	-	168.27
200	381.0	330.2	25.4	12	41.3	260.3	61.9	111.1	61.9	221.5	222.2	269.9	-	219.07
250	444.5	387.3	28.6	16	47.6	320.7	66.7	117.5	95.2	276.3	277.4	323.8	-	273.05
300	520.7	450.8	31.7	16	50.8	374.6	73.0	130.2	101.6	327.1	328.2	381.0	-	323.85
350	584.2	514.3	31.7	20	54.0	425.4	76.2	142.9	111.1	359.1	360.2	412.7	-	355.60
400	647.7	571.5	34.9	20	57.2	482.6	82.5	146.0	120.6	410.5	411.2	469.9	-	406.40
450	711.2	628.5	34.9	24	60.3	533.4	88.9	158.7	130.2	461.8	462.3	533.4	-	457.20
500	774.7	685.8	34.9	24	63.5	587.4	95.2	161.9	139.7	513.1	514.3	584.2	-	508.00
600	914.4	812.8	41.3	24	69.8	701.7	106.4	168.3	152.4	615.9	615.9	692.1	-	609.60

Metric values are direct conversion from inches table of B16.5

Flanges except Lap Joint will be furnished with (1.6 mm) raised face, Which is included in " Thickness" (C) and Length Through Hub (Y).

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